



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

50-02-08

Log Event A

Borehole Information

Farm : <u>T</u>	Tank : <u>T-102</u>	Site Number : <u>299-W10-116</u>
N-Coord : <u>43,627</u>	W-Coord : <u>75,787</u>	TOC Elevation : <u>671.91</u>
Water Level, ft : <u>81.2</u>	Date Drilled : <u>7/31/1973</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>87</u>	
Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>87</u>	

Cement Bottom, ft. : 87 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-02-08 was drilled in July 1973 and completed to a depth of 87 ft using 6-in.-diameter casing. In August 1980, the original 6-in. casing was perforated from 0 to 20 ft and 85 to 87 ft, a 4-in. casing was installed inside the 6-in. casing, and the annular space was filled with grout.

Equipment Information

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/04/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>5.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>2</u>	Log Run Date : <u>06/05/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>4.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>56.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>06/08/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>85.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>55.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Logging Operation Notes:

This borehole was logged by the SGLS in three log runs using a 200-s counting time. The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface. The total logging depth achieved was 85.0 ft. During logging, this borehole contained standing water below 81.2 ft.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 11/02/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

This borehole was completed with 4-in. and 6-in.-diameter casings along the entire logged interval. A casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. The entire annulus between the 4-in. and 6-in. casings is likely filled with grout, making it impossible to produce accurate radionuclide assays. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Approximately 4.5 ft of water has collected inside the bottom of this borehole. The appropriate water correction factor was not available, so no compensation was applied. This will result in lower reported man-made and natural radionuclide concentration values along the water-filled interval.

Log Plot Notes:

Separate log plots show the apparent man-made and the naturally occurring radionuclide concentrations. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot showing the man-made radionuclide contamination correlated between boreholes 50-03-04, 50-02-08, and 50-02-09 is included with the Tank Summary Data Report for Tank T-102.

A time-sequence plot of historical gross gamma-ray data collected between 1975 and 1994 is presented.

Results/Interpretations:

The radionuclide concentrations identified in this section are reported as apparent concentrations only and are



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underestimated.

The man-made radionuclides Cs-137, Co-60, Eu-154, Eu-152, Nb-94, and U-238 were detected by the SGLS. The Cs-137 contamination was detected at the ground surface and from 1 to 2 ft.

The Co-60 contamination was measured continuously from 39.5 to 49 ft. Isolated occurrences of Co-60 were detected at 53.5 ft, from 67 to 70.5 ft, and at 83.5 ft.

The Eu-154 contamination was measured nearly continuously from 39.5 to 48.5 ft. Small intervals of Eu-154 were detected from 53 to 53.5 ft, 67.5 to 70.5 ft, and at 83 ft.

A small zone of continuous Eu-152 contamination was measured from 40.5 to 43 ft.

An isolated occurrence of Nb-94 was detected from 41 to 41.5 ft.

A single occurrence of U-238 was detected at 44 ft.

Significantly elevated K-40 concentration values were detected from 37.5 to 41.5 ft, and the concentrations and remain elevated to 48.5 ft. The U-238 concentrations are absent from 40 to 45 ft. The KUT concentration values increase at about 79 ft and remain elevated to the bottom of the logged interval (85 ft).

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks T-102 and T-103.